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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,865	12/27/2000	Noriyuki Hirayanagi	4641-56502	7443

7590 08/07/2003

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EXAMINER	
KACKAR, RAM N	

ART UNIT	PAPER NUMBER
1763	11

DATE MAILED: 08/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/749,865	HIRAYANAGI ET AL.	
	Examiner	Art Unit	
	Ram N Kackar	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16 and 18-46* is/are pending in the application.

4a) Of the above claim(s) *7-14,18-37 and 43-46* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,15-16, 38-40 and 42* is/are rejected.

7)☒ Claim(s) *41* is/are objected to.

8)☒ Claim(s) *1-16 and 18-46* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
4) ☐ Interview Summary (PTO-413) Paper No(s) _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 1-6, 15-16 and 38-42 in Paper No. 10 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6 and 15-16 are rejected under 35 U S.C. 103(a) as being unpatentable over Matsuda et al (US 6254683) in view of Parkhe (US 6033482) and Kakehi Yutaka (JP 07-273178).

Matsuda et al disclose a substrate holding device comprising an electrostatic chuck (Fig 2), and a channel at the back-side of wafer (Fig 2 102 and 103 and column 1 lines 54-56), a helium gas supply conduit (Fig 2-116) gas evacuation conduit (115), valves to control the flow of helium gas to the channel (115, 140, 141) and heat transfer gas supply pressure of 2000 Pa.

Matsuda et al also disclose the method of fabrication process including the back-side gas cooling (Col 1 line 66 to Col 2 line 46). Matsuda et disclose the fabrication steps after load and chuck the substrate as (i) Flow HTG (ii) execute process and (iii) evacuate HTG.

Matsuda et al do not disclose evacuation of HTG during execution of fabrication process and a controller configured to control all aspects of the system including fabrication process.

Kakehi Yutaka discloses the process sequence steps (Abstract and Paragraph 32) and discloses that the supply of HTG may be shut down almost before completion of etching process when RF power for plasma and DC power for chucking is turned off.

Parkhe discloses microprocessor-based controller to control all aspects of fabrication including substrate back- side cooling (Fig 1-160).

Therefore it would have been obvious to use a controller like that of Parkhe to control the apparatus of Matsuda so as to ensure accuracy, reliability and higher through put.

Regarding claims 2-5 as the controllers work through a preprogrammed recipe predetermined time would be obviously part of it.

Regarding claim 4 Kakehi Yutaka discloses turning off heat transfer gas just before completion of fabrication process. Obviously turning off HTG too early could be harmful as the temperature of substrate could rise above acceptable level. Therefore it would be obvious that HTG is not turned off before 80% completion of the fabrication process.

Claims 6 and 16 are not patentable as being directed to an intended use. The controller disclosed by Parkhe would be capable of controlling the sequence of a process typically encountered in an exposure process as above.

4. Claims 38-40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shamouilian et al (US 6320736) in view of Onishi et al (JP62136570).

Shamouilian et al disclose a substrate holding device comprising an electrostatic chuck (Fig 1), and a channel at the back-side of wafer (56a or 56b), a helium gas supply conduit (50) and a filter to remove impurities from heat transfer gas (Fig 5-60).

Shamouilian et al do not disclose the filter to be a cold trap.

Onishi et al discloses the use of cold trap to remove harmful gases from the exhaust gas to make it clean and recycle to the chamber and valve to isolate from chamber so as to remove the impurities by exhausting (abstract and Page 2 lines 9-22 translation in English).

Therefore it would have been obvious for one of ordinary skill in the art at the time invention was made to use a cold trap of Onishi et al in place of ordinary filter so as to make sure that moisture and gaseous impurities are also removed from helium so as to have efficient heat transfer and keep the gas passages uncontaminated.

Allowable Subject Matter

5. Claim 41 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Amendment

6. Applicant's arguments filed 7/7/2003 have been fully considered but they are not persuasive.

Applicant argues that in Matsuda et al there are no channels for heat transfer gas. Examiner disagrees.

As acknowledged by the applicant, surface of the chuck has holes (Col 1 lines 44-47) to allow HTG to spread to the gap (Col 1 lines 54-56 and Col 2 lines 15-17) between the substrate and the chuck. The holes to allow passage of gas would be same as channels.

Applicant argues that in Matsuda et al there is no concern for evacuation of heat transfer gas and large scale dumping of heat transfer gas could occur. Examiner disagrees.

Matsuda et al clearly discloses (Col 2 lines 39-44) that the heat transfer gas is evacuated until it reaches the pressure in the initial condition i.e., at the ambient pressure of the vacuum chamber.

Regarding applicants remarks in reference to Parkhe, it should be noted that this reference is basically used to show disclosure of a controller designed to control all devices and tasks typical to a plasma processing apparatus with electrostatic chuck and heat transfer gas cooling.

Applicant argues that rejection of claim 4 in last office action was not understood since no citation was provided; no sense could be made of it and was irrelevant. In response the Examiner states the following.

The claim recited that the configured time of evacuating the heat transfer gas came at an instant when the fabrication was at least 80% complete. Since the claim did not specify the upper limit, if in the reference, gas evacuation started at the instance when fabrication process was 100% complete, the reference would perfectly read on the claim. In Matsuda this is disclosed in Col 2 lines 39-42.

Applicants other remarks regarding claims 6 and 16 as being directed to an intended use are noted but not found to be persuasive. The controller disclosed by Parkhe as programmed by Kakehi Yutaka would be capable of controlling claimed exposure process.

Applicant contends that neither Matsuda nor Parkhe disclose or suggest an adhesion surface that defines a channel. Examiner disagrees.

As discussed above, both Matsuda and Parkhe disclose an adhesion surface caused by electrostatic chuck and disclose passage for heat transfer gas under the substrate (Fig 1 for both).

Regarding claim 38 the applicant argues that Shamouilian does not indicate awareness of the problem as indicated in claim 15 and specification at page 2. Examiner disagrees.

Claim 38 is directed to a cold trap for removing impurities from heat transfer gas. Shamouilian et al are concerned with impurities in heat transfer gas and disclose filter for their removable. They however do not disclose a cold trap. Onishi et al teach use of cold trap to remove impurities. The rejection relies on this combination.

Regarding telephone interview, MPEP 713.09 states that normally one interview after final is permitted. Nevertheless, if the applicant wants to call the examiner to clarify any specific issue regarding prosecution, he is welcome to do so. The telephone number and examiners normal working hours are indicated below.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 703 305 3996. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703 308 1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9310 for regular communications and 703 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK
August 6, 2003